CLAIMS

What is claimed is:

1.   A method for deleting one or more of a plurality of files, the files including one or more chunks stored by a plurality of servers, the method comprising:

identifying a file to be deleted;

renaming the identified file;

permanently deleting the renamed file a predetermined amount of time after renaming the identified file as part of a garbage collection process;

receiving, from the servers, information concerning chunks stored by the servers; and

identifying, to the servers, ones of the chunks that do not exist possibly due to the permanent deletion of the renamed file.

2.   The method of claim 1, wherein the identifying a file to be deleted includes:

receiving a deletion instruction regarding the file.

3.   The method of claim 2, further comprising:

receiving an un-deletion instruction regarding the file; and

restoring an original name to the file without permanently deleting the renamed file.

4.   The method of claim 1, wherein the predetermined amount of time is a user-configurable amount of time.

5.   The method of claim 4, wherein the user-configurable amount of time differs for

different ones of the files.

6.   The method of claim 1, wherein metadata is associated with the files; and

wherein the permanently deleting the renamed file includes erasing the metadata

associated with the renamed file.

7.   The method of claim 1, further comprising:

deleting, by the servers, the ones of the chunks that do not exist.

8.   The method of claim 1, further comprising:

identifying orphaned ones of the chunks, including:

    providing a mapping of file names to chunks, and

    identifying chunks, as the orphaned chunks, that are not reachable from any of the

file names; and

deleting the orphaned chunks.

9.   The method of claim 8, wherein metadata is associated with the chunks; and

wherein the deleting the orphaned chunks includes erasing the metadata associated with

the orphaned chunks.

10.   The method of claim 1, further comprising:

maintaining versions of the chunks;

identifying stale ones of the chunks based on the versions of the chunks; and

deleting the stale chunks.

11. The method of claim 10, wherein metadata is associated with the chunks; and wherein the deleting the stale chunks includes erasing the metadata associated with the stale chunks.

12. A system for deleting a file that includes data stored by a plurality of servers, comprising:

means for identifying a file to be deleted;

means for logging deletion of the identified file;

means for permanently deleting the file during a garbage collection process that occurs after logging deletion of the identified file;

means for receiving, from the servers, information concerning data stored by the servers; and

means for identifying, to the servers, that of the data that does not exist possibly due to the permanent deletion of the renamed file.

13. A file system, comprising:

a plurality of servers configured to store files as chunks, each of the files including one or more of the chunks; and

a master connected to the servers and configured to:

identify one of the files to be deleted,

rename the identified file,

permanently delete one or more chunks associated with the renamed file a predetermined amount of time after renaming the identified file as part of a garbage collection process,

receive, from the servers, information concerning chunks stored by the servers, and

identify, to the servers, ones of the chunks that do not exist, the ones of the chunks including the one or more permanently deleted chunks.

14.   A method for deleting orphaned chunks of a plurality of chunks stored by a plurality of servers, the method comprising:

providing a mapping of file names to chunks;

identifying chunks, as orphaned chunks, that are not reachable from any of the file names;

deleting the orphaned chunks;

receiving, from the servers, information concerning chunks stored by the servers; and

identifying, to the servers, ones of the chunks that are orphaned chunks.

15.   The method of claim 14, wherein metadata is associated with the chunks; and wherein the deleting the orphaned chunks includes erasing the metadata associated with the orphaned chunks.

16. The method of claim 14, further comprising:

deleting, by the servers, the orphaned chunks.

17. The method of claim 14, wherein the deletion of the orphaned chunks occurs as part of a garbage collection process.

18. A system for deleting orphaned chunks of a plurality of chunks stored by a plurality of servers, comprising:

means for mapping file names to chunks;

means for identifying chunks, as orphaned chunks, that are not reachable from any of the file names;

means for deleting the orphaned chunks as part of a garbage collection process;

means for receiving, from the servers, information concerning chunks stored by the servers; and

means for identifying, to the servers, ones of the chunks that are orphaned chunks.

19. A file system, comprising:

a plurality of servers configured to store files as chunks, each of the files including one or more of the chunks; and

a master connected to the servers and configured to:

map file names to chunks,

identify chunks, as orphaned chunks, that are not reachable from any of the file

names,

delete the orphaned chunks,

receive, from the servers, information concerning chunks stored by the servers,

and

identify, to the servers, ones of the chunks that are orphaned chunks.

20.   A method for deleting stale replicas of chunks, the replicas being stored by a

plurality of servers, the method comprising:

associating version information with replicas of chunks;

identifying stale replicas based on the associated version information;

deleting the stale replicas;

receiving, from the servers, information concerning replicas stored by the servers; and

identifying, to the servers, ones of the replicas that are stale replicas.

21.   The method of claim 20, wherein the version information for one of the replicas is

updated each time a lease is granted to the replica.

22.   The method of claim 20, further comprising:

deleting, by the servers, the stale replicas.

23.   The method of claim 20, wherein the deletion of the stale replicas occurs as part of a garbage collection process.

24.   A system for deleting stale replicas of chunks, the replicas being stored by a plurality of servers, the system comprising:

means for generating version information for replicas of chunks;

means for identifying stale replicas based on the generated version information;

means for deleting the stale replicas as part of a garbage collection process;

means for receiving, from the servers, information concerning replicas stored by the servers; and

means for identifying, to the servers, ones of the replicas that are stale replicas.

25. ¹ A file system that stores files as chunks, comprising:

a plurality of servers configured to store files as chunks; and

a master connected to the servers and configured to:

associate version information with the chunks,

identify stale chunks based on the associated version information,

delete the stale chunks,

receive, from the servers, information concerning replicas stored by the servers, and

identify, to the servers, ones of the replicas that are stale replicas.